

Dual-Language Immersion Programs Raise Student Achievement in English

Dual-language immersion (DLI) programs—which provide both native English speakers and English learners with general academic instruction in two languages from kindergarten onward—are proliferating rapidly in the United States. Although precise counts of DLI programs are not available, recent estimates place the figure between 1,000 and 2,000 nationally, with substantial recent growth in Utah, North Carolina, Delaware, and New York City.

This expansion appears driven by a number of complementary forces: a large increase in the share of U.S. schoolchildren who are not native English speakers; observational evidence that English learners in DLI programs academically outperform those in other programs; and demand from parents of native English speakers who anticipate the benefits of bilingualism in an increasingly global society.

In the largest random-assignment study of DLI education to date, RAND partnered with the American Councils on International Education and the Portland Public Schools in Oregon (PPS) to estimate the causal effects of the district's DLI programs on student performance over time in reading, mathematics, and science, and on English learners' reclassification as English proficient. The four-year study was funded by the U.S. Department of Education's Institute of Education Sciences.

Leveraging random assignment to identify the causal effects of DLI programs

PPS provides a strong test bed for examining dual-language education at scale because the district offers a wide array of DLI programs—some dating to the mid-1980s—and because it has historically allocated immersion slots using a random-assignment lottery process for those who apply to the programs. The scale of PPS's immersion offerings allowed the study to include both *two-way programs*, in which about half of the students are native speakers of English and half are native speakers of the “partner” (non-English) language, and *one-way programs*, in which most students in the classroom are new to the partner language. In addition, the study was able to include programs that represented four different partner languages: Spanish, Japanese, Mandarin Chinese,

Key findings:

- Portland Public Schools (PPS) students randomly assigned to dual-language immersion programs outperformed their peers on state reading tests by 13 percent of a standard deviation in grade 5 and by 22 percent of a standard deviation in grade 8.
- Immersion-assigned students did not show statistically significant benefits or deficits in terms of mathematics or science performance.
- There were no clear differences in the effects of dual-language immersion by students' native language.
- English learners assigned to dual-language immersion were more likely than their peers to be classified as English proficient by grade 6. This effect was mostly attributed to English learner students whose native language matched the classroom partner language.

and Russian. The random-assignment process allowed the study to estimate effects *caused* by access to these programs and not by the unobserved characteristics or preferences of families who chose DLI. Due to the scale and longevity of Portland's offerings, the study is one of a very few able to estimate academic effects for both native English speakers and English learners, and to track students' performance for up to nine years, from kindergarten through eighth grade.

DLI students outperformed non-immersion peers in two important ways

Prior studies of DLI have shown that students in such programs perform as well as or better than their peers in core content areas such as English language arts, mathematics, and science—which are all typically tested in English—especially by mid-elementary school. However, those studies left open the question of whether the effects should be attributed to the DLI programs themselves or to the characteristics of the families and students who chose to enroll in

Fast facts about Portland Public Schools and the study

- At study commencement in 2012, PPS served about 46,000 students and was among the two largest districts in the Pacific Northwest.
- PPS has offered DLI programs since 1986.
- In fall of 2012, approximately one-fourth of PPS's schools offered immersion programs, and about 8 percent of students were enrolled in such programs.
- The study included programs in Spanish, Japanese, Mandarin Chinese, and Russian.
- The study focused on 1,625 DLI lottery applicants in the kindergarten cohorts of 2004–2005 through 2010–2011.
- Student achievement was tracked through 2013–2014.

those programs. By comparing students who applied to DLI programs and were given spaces through random assignment with those who applied but were not randomly assigned spaces, the RAND study was able to answer that question. The study focused on 1,625 students who were randomized to immersion or to a control group via Portland's immersion pre-K and kindergarten immersion lotteries in 2004–2005 through 2010–2011. Further, through collaboration with the Oregon Department of Education, the study team was able to track the outcomes not only for lottery applicants who remained within PPS, but also for those who subsequently entered other public school districts in Oregon.

PPS DLI programs had positive effects on reading test scores

- PPS students randomly assigned to DLI outperformed their peers on state accountability tests in reading by 13 percent of a standard deviation in grade 5 and by 22 percent of a standard deviation in grade 8. This represents roughly seven additional months of learning in grade 5 and nine additional months in grade 8.¹ While the researchers did not find a statistically significant benefit in math or science, they also found no detriment, even though students received math and science instruction at least partially in the partner language through grade 5.

English learners reached English proficiency at higher rates

- Controlling for whether students were classified as English learners in kindergarten, those who were randomly

assigned to DLI were three percentage points more likely to have reached English proficiency by grade 6. This effect was stronger for English learners whose native language matched the partner language, for whom the effect was as high as 14 percentage points in sixth grade. These findings are consistent with other research that finds that DLI helps English learners become proficient in English at higher rates by middle or high school.

The effects on student outcomes were similar across student groups

- The effects of immersion programs on student test scores appeared to be similar for students who were native English speakers and those who were native speakers of other languages. The small difference between the estimated effects of DLI programs for these two groups was not statistically significant.
- The estimated immersion benefits in reading appeared slightly higher for students in Spanish DLI programs than for students in programs focused on less commonly taught languages (Japanese, Mandarin Chinese, and Russian), but these differences were not statistically significant. In mathematics, immersion benefits appeared slightly greater for the less commonly taught languages than for Spanish, but neither the overall mathematics effects nor the differences by program language were statistically significant.
- Immersion effects did not appear to differ between two-way and one-way immersion programs.

It is also noteworthy that by eighth grade, on average, PPS DLI students reached intermediate levels of proficiency in the partner languages as measured by the STAMP 4S (Standards-Based Measurement of Proficiency), compared with the novice levels of proficiency attained by PPS eighth-graders studying Spanish in non-immersion foreign language classes.

Lessons for policymakers

Policymakers should note that the benefits of DLI programs—improved reading in English, increased English proficiency for English learners, and proficiency in two languages—did not come at the cost of performance in mathematics or science. These outcomes may make the programs highly attractive to policymakers, administrators, educators, and families. Importantly, this evidence comes not from a small, boutique program, but from a collection of 12 varied DLI programs dispersed across a large, urban district and operating over a ten-year period. The variation among the programs means that the findings are not limited to one particular school, classroom language, or instructional approach.

¹ Months-of-learning estimates are based on the difference in vertically scaled scores between grades 4 and 5 and between grades 7 and 8, and on the pooled standard deviations in performance in grades 5 and 8.

It is important to note that these causal effects apply most clearly to families that were motivated to apply to DLI programs. If a program of this nature were mandatory for everyone in a school district, the results might differ, for three reasons. First, students whose families were not supportive of DLI could feasibly struggle more in immersion than students whose families applied to an immersion lottery. Second, randomization to immersion in Portland changes not only the language of instruction but also the particular teachers and peers to which students are exposed. Although the study found that immersion benefits were not attributable to observable teacher or peer characteristics, it is still possible that program attributes other than the language of instruction could have contributed to the benefits. Third, dramatic

expansion of such programs could dilute program quality. Therefore, efforts to scale DLI programs should carefully attend to the quality of program implementation.

Finally, equitable access to DLI programs is important. Participation by English learners along with native English speakers is not only critical to the integrity of two-way models but also helps ensure that academic benefits are fairly distributed within a community. This study provides some of the strongest causal evidence available that DLI programs can improve students' reading skills in English while also building their skills in a language other than English. Expanding the high-quality implementation of these programs could play a pivotal role in the struggle for educational opportunity for English learners and native English speakers alike.

This brief describes work done in RAND Education and documented in Jennifer L. Steele, Robert O. Slater, Gema Zamarro, Trey Miller, Jennifer Li, Susan Burkhauser, and Michael Bacon, "Effects of Dual-Language Immersion Programs on Student Achievement: Evidence from Lottery Data," *American Educational Research Journal*, Vol. 54, No. 1 suppl., April 2017. To view this brief online, visit www.rand.org/t/RB9903. The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. RAND® is a registered trademark. © RAND 2017

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